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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/801,431	03/16/2004	David Alan Johnson	5	3091

7590 10/15/2007
David A. Johnson
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Colorado Springs, CO 80919

EXAMINER

KRAIG, WILLIAM F

ART UNIT	PAPER NUMBER
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2815

MAIL DATE	DELIVERY MODE
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10/15/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/801,431	Applicant(s) JOHNSON ET AL.	
	Examiner William Kraig	Art Unit 2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

1. Claims 1-8 are rejected under 35 U.S.C. 112, second paragraph, as failing to define the invention in the manner required by 35 U.S.C. 112, second paragraph.

Regarding claim 1, these claims contain the limitation, "with significant topography reduction compared to the traditional composite dielectric structure". This limitation is considered to be vague and indefinite because said "traditional composite dielectric structure" is not further described from a structural perspective. As such, the scope of the limitation in question ("with significant topography reduction compared to the traditional composite dielectric structure") is unclear to the Examiner. The structure which goes to make up the device must be clearly and positively specified in the claims. The structure must be organized and correlated in such a manner as to present a complete operative device.

Further, the claims lack antecedent basis for the limitation "the traditional composite dielectric structure". The Examiner will examine the claim with "the traditional composite dielectric structure" replaced by --a traditional composite dielectric structure--. To clarify, it is necessary within the claim to 'introduce' any limitation that has not been previously referred to in the claims. The use of the limitation "the traditional composite dielectric structure" implies that said traditional composite

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dielectric structure has been previously introduced in the claims. Utilizing the Examiner's suggested form --a traditional composite dielectric structure--, makes it clear that this limitation is a newly introduced limitation. However, this simple amendment is not enough to overcome the vagueness and indefiniteness associated with this same limitation, as addressed above.

2. Claims 2-8 are also included in this rejection under 35 U.S.C. 112, 2nd Paragraph, because they are dependent from claim 1 (rejected above).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. As best understood (in light of the above rejection under 35 U.S.C. 112, 2nd Paragraph), claims 1-7 are rejected under 35 U.S.C. 102(e) as being anticipated by Hadizad (US 2005/0029993 A1).

Regarding claim 1, Hadizad (e.g. Fig. 1) discloses a structure (see Fig. 1 of Hadizad) providing anneal cap, ion implant mask, and shallow trench isolation features for III-V devices comprising:

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a trench (28) etched into the semiconductor (13, 17), a combination anneal cap/CMP stop layer (63), and a dielectric trench fill layer (66) (see Paragraph [0028] for particular materials), with significant topography reduction compared to a traditional dielectric structure.

Regarding claim 2, Hadizad discloses the device of claim 1, wherein said III-V semiconductor is GaAs (Hadizad; Paragraph [0021]).

Regarding claim 3, Hadizad discloses the device of claim 1, wherein said III-V semiconductor is InP (Hadizad; Paragraph [0021]).

Regarding claims 4 and 5, Hadizad discloses the device of claim 1, wherein said III-V semiconductor is GaAs (13) with over-layers (17) (see Fig. 1) of other semiconductors specific to the devices fabricated.

Regarding claim 6, Hadizad discloses the device of claim 1, where said combination anneal/cap CMP stop layer is 500 angstroms (Paragraph [0028]).

Regarding claim 7, Hadizad discloses the device of claim 1, wherein said combination anneal cap/CMP stop layer (63) is silicon nitride (Paragraph [0028]) with a thickness 5 to 25 percent of the trench depth to facilitate CMP processing (Layer 63 has a thickness of .05-.3 microns (Paragraph [0028]) while the depth of the trench is .5-5 microns (Paragraph [0025])).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hadizad in view of Kamath et al. (U.S. Patent # 6949446).

Regarding claim 8, Hadizad discloses the device of claim 1, wherein said dielectric trench fill layer 66 is a spin-on-dielectric (Paragraph [0028]), but fails to specifically disclose said spin-on-dielectric being silicon dioxide.

Kamath et al. teaches a similar semiconductor device wherein a trench fill layer is formed of silicon dioxide utilizing a spin on process (Col. 1 and 2, Bridging Paragraph).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the spin on silicon dioxide of Kamath et al. into the device of Hadizad. The ordinary artisan would have been motivated to modify Hadizad in the above manner for the purpose of sufficiently isolating active areas between the trenches (Kamath et al., Col. 1 and 2, Bridging Paragraph).

Response to Arguments

5. Applicant's arguments filed 08/11/06 have been fully considered but they are not persuasive. The majority of Applicant's arguments are moot in view of the new grounds of rejection as seen above.

Applicant argues (pp. 5 of 11) that the device of Deshpande that expresses "the attempted thermal oxidation of the GaAs wafer [would be] a disaster." Applicant continues (pp. 6 of 11) that Deshpande also fails as prior art because "no silicon nitride layer is deposited in the Deshpande invention."

These specific arguments have been taken into consideration and are addressed by the new rejection above. Hadizad (and Kamath et al.) disclose the device of the pending claims, and even more specifically discloses that the silicon nitride layer is formed by "deposition" (section [0028]). Though the limitation regarding deposition was not claimed in the instant claims, the office cites these references (Hadizad and Kamath et al.) to more specifically address the concerns of the applicant.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to William Kraig whose telephone number is 571-272-8660. The examiner can normally be reached on Mon-Fri 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Parker can be reached on 571-272-2298. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

WFK
10/4/2007



KENNETH PARKER
SUPERVISORY PATENT EXAMINER